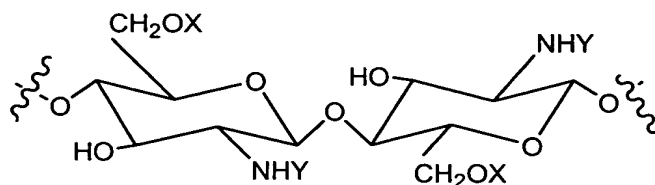


CLAIMS

1. An N-acylated chitinous polymer, wherein said chitinous polymer is comprised of subunits of the formula:

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wherein

X is independently selected from hydrogen, $-(\text{CH}_2)_b\text{COG}$, or $-(\text{CH}_2)_b\text{COOZ}$ for each occurrence, provided that at least 10% of X groups on said polymer are $-(\text{CH}_2)_b\text{COOZ}$ or $-(\text{CH}_2)_b\text{COG}$;

Y is independently selected from $-\text{C}(=\text{O})-\text{R}-\text{CO}_2\text{Z}$, $-\text{C}(=\text{O})-\text{R}-\text{COG}$, hydrogen, carboxyalkyl, acetyl, or a pharmaceutically acceptable salt thereof for each occurrence, provided that at least 1 % of Y groups on said polymer are $-\text{C}(=\text{O})-\text{R}-\text{CO}_2\text{Z}$ or $-\text{C}(=\text{O})-\text{R}-\text{COG}$;

R is independently selected from the group consisting of alkyl, alkenyl, and aryl; b is 1-8;

G is an agent or a pharmaceutically acceptable salt thereof; and

Z is hydrogen, a cation, an agent, or a pharmaceutically acceptable salt thereof.

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2. The N-acylated chitinous polymer of claim 1, wherein at least 30% of said X groups on said polymer are of the formula $-(\text{CH}_2)_b\text{COOZ}$ or $-(\text{CH}_2)_b\text{COG}$.

3. The N-acylated chitinous polymer of claim 1, wherein b is 1-5.

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4. The N-acylated chitinous polymer of claim 3, wherein b is 1.

5. The N-acylated chitinous polymer of claim 1, wherein at least 10% of said Y groups on said polymer are $-\text{C}(=\text{O})-\text{R}-\text{CO}_2\text{Z}$ or $-\text{C}(=\text{O})-\text{R}-\text{COG}$.

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6. The N-acylated chitinous polymer of claim 5, wherein at least 20% of said Y groups on said polymer are $-\text{C}(=\text{O})-\text{R}-\text{CO}_2\text{Z}$ or $-\text{C}(=\text{O})-\text{R}-\text{COG}$.

7. The N-acylated chitinous polymer of claim 1, wherein R is $-(CH_2)_a-$, wherein a is 1-8.
8. The N-acylated chitinous polymer of claim 7, wherein a is 2, 3, or 4.
9. The N-acylated chitinous polymer of claim 1, wherein R is aryl.
10. The N-acylated chitinous polymer of claim 1, wherein R comprises one or more heteroatoms.
11. The N-acylated chitinous polymer of claim 1, wherein said polymer is selected from the group consisting of N,O-carboxymethyl-N-succinylchitosan, N,O-carboxymethyl-N-citraconylchitosan, N,O-carboxymethyl-N-glutarylchitosan, and mixtures thereof.
12. The N-acylated chitinous polymer of claim 1, wherein said polymer is water soluble.
13. The N-acylated chitinous polymer of claim 10, wherein said polymer is water soluble at pH's from about 1 to about 11.
14. The N-acylated chitinous polymer of claim 1, wherein Z is an agent.
15. The N-acylated chitinous polymer of claim 1 or 14, wherein said agent is a therapeutic agent.
16. The N-acylated chitinous polymer of claim 15, wherein said therapeutic agent is an anti-cancer agent.
17. The N-acylated chitinous polymer of claim 15, wherein said therapeutic agent is an agent for the treatment of a central nervous system disorder.
18. The N-acylated chitinous polymer of claim 15, wherein said therapeutic agent is an anti-inflammatory agent.

19. The N-acylated chitinous polymer of claim 13, wherein said therapeutic agent is selected from the group consisting of 5-aminosalicylic acid, doxorubicin, peptides, and mixtures thereof.
- 5 20. A method for administering an agent in a subject comprising administering an N-acylated-N,O-carboxyalkylchitosan associated with an agent, and allowing said agent to be released in said subject.
21. The method of claim 20, wherein said agent is released in a low pH environment.
- 10 22. The method of claim 20, wherein said agent is released in said subject's intestine, stomach, urinary tract, or reproductive tract.
23. The method of claim 20, wherein said N-acylated-N,O-carboxyalkylchitosan is an N-acylated chitinous polymer of claim 1.
- 15 24. A method for treating a subject suffering from a disorder comprising administering an effective amount of an N-acylated-N,O-carboxyalkylchitosan associated with a therapeutic agent to treat said disorder.
- 20 25. The method of claim 24, wherein said disorder is selected from the group consisting of cancer, nervous system disorder, a urinary tract disorder, gastrointestinal tract disorder, and reproductive tract disorder.
- 25 26. The method of claim 24, wherein said therapeutic agent is released in said subject from said N-acylated-N,O-carboxyalkylchitosan.
27. The method of claim 24, wherein said N-acylated-N,O-carboxyalkylchitosan is an N-acylated chitinous polymer of claim 1.
- 30 28. A method for treating a subject suffering from a urinary tract disorder comprising administering an effective amount of an N-acylated-N,O-carboxyalkylchitosan associated with a therapeutic agent to treat said urinary tract disorder.
- 35 29. The method of claim 28, wherein said urinary tract disorder is a bladder infection.

30. The method of claim 29, wherein said bladder infection is interstitial cystitis.
31. The method of claim 19, wherein said therapeutic agent is an antibiotic or anti-
5 inflammatory agent.
32. A method for treating a subject suffering from reproductive tract disorder comprising administering an effective amount of an N-acylated-N,O-carboxyalkylchitosan associated with a therapeutic agent to treat said reproductive tract
10 disorder.
33. The method of claim 32, wherein said reproductive tract disorder is a disorder of the female reproductive tract.
- 15 34. The method of claim 32, wherein said reproductive tract disorder is a disorder of said subject's vagina or uterus.
35. The method of claim 32, wherein said agent is an antibiotic or an anti
inflammatory agent.
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36. The method of claim 33, wherein said reproductive tract disorder is infertility, a uterine fibroid, a pelvic mass, or endometriosis.
37. A method for treating a subject suffering from cancer comprising administering
25 an effective amount of an N-acylated-N,O-carboxyalkylchitosan associated with an anti-cancer agent to treat said cancer.
38. The method of claim 37, wherein said cancer is bladder cancer.
- 30 39. The method of claim 38, wherein said anti-cancer agent is selected from the group consisting of BCG, α -interferon, valrubicin, mytomicin, and combinations thereof.
40. A method for treating a subject suffering from a nervous system disorder
35 comprising administering an effective amount of an N-acylated-N,O-carboxyalkylchitosan associated with a therapeutic agent to treat said nervous system disorder.

41. A method for preventing surgical adhesion in a subject, comprising administering to a subject an effective amount of an N-acylated-N,O-carboxyalkylchitosan, to prevent surgical adhesion in said subject.

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42. A cross linked N-acylated-N,O-carboxyalkylchitosan.

43. The cross linked N-acylated-N,O-carboxyalkylchitosan of claim 42, wherein said chitosan is cross linked with divinyl sulfone.

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44. The cross linked N-acylated-N,O-carboxyalkylchitosan of claim 42, wherein said cross linked chitosan forms a hydrogel in water.

45. A pharmaceutical composition, comprising the cross linked N-acylated-N,O-carboxyalkylchitosan of claim 42 and a pharmaceutically acceptable carrier.

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46. The pharmaceutical composition of claim 45, wherein said composition further comprises a therapeutic agent.

47. A pharmaceutical composition comprising the N-acylated chitinous polymer of claim 1 and a pharmaceutically acceptable carrier.

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48. The pharmaceutical composition of claim 47, wherein said composition further comprises a therapeutic agent.

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49. The pharmaceutical composition of claim 48, wherein said therapeutic agent is dispersed within said N-acylated chitinous polymer.

50. The pharmaceutical composition of claim 47, wherein said N-acylated-N,O-carboxyalkylchitosan is formulated as microcapsules, nanocapsules, a gel, polymer, thin film, or a mixture thereof.

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